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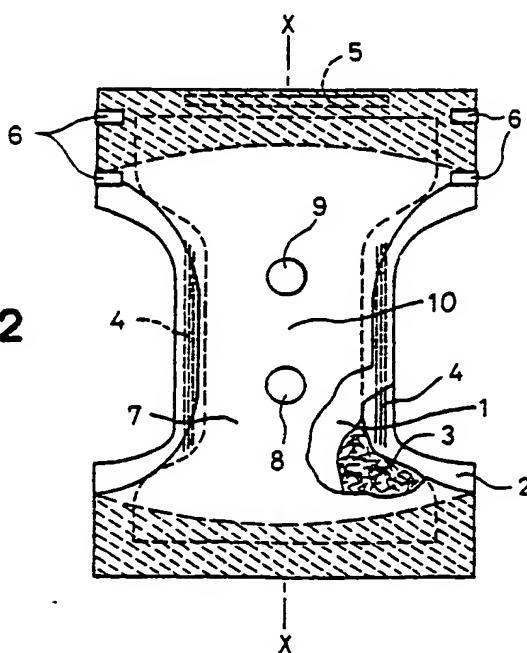
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(54) Disposable diapers

(57) A disposable diaper has a stretchable liquid-permeable sheet 7 laid on the liquid-permeable topsheet of a basic diaper structure and this sheet 7 is provided at locations corresponding to urinary organs and anus with openings 8, 9, respectively, which are independent from each other so as to prevent excrement from spreading over the crotch zone of a wearer and particularly to prevent excrement from clinging to urinary and genital organs.

FIG.2



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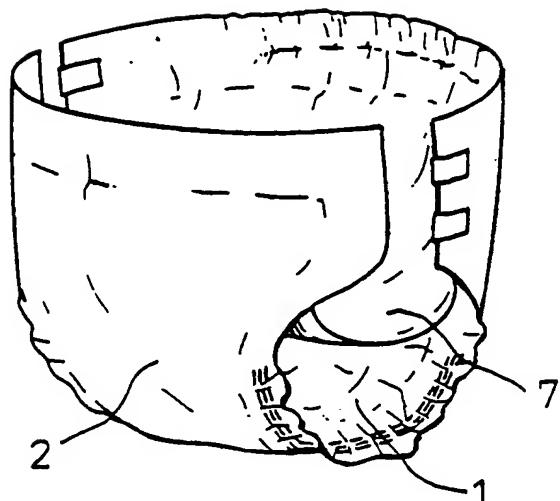


FIG.1

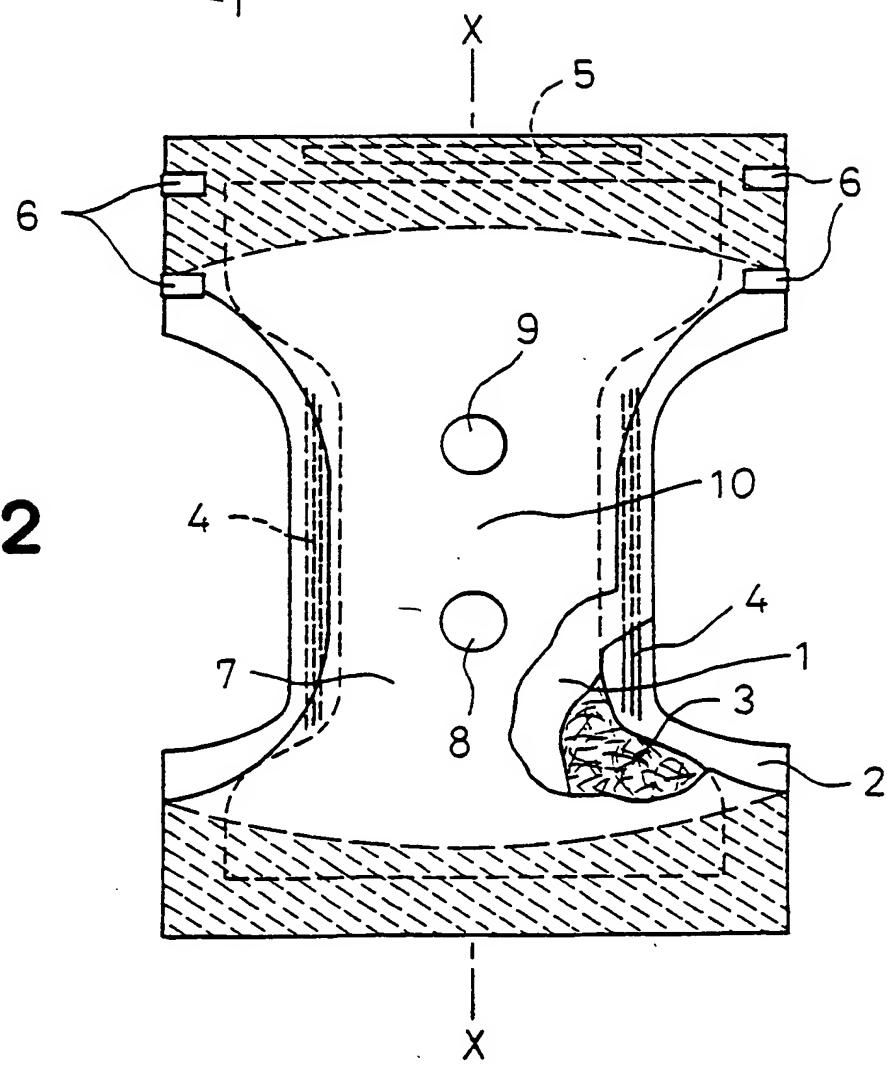
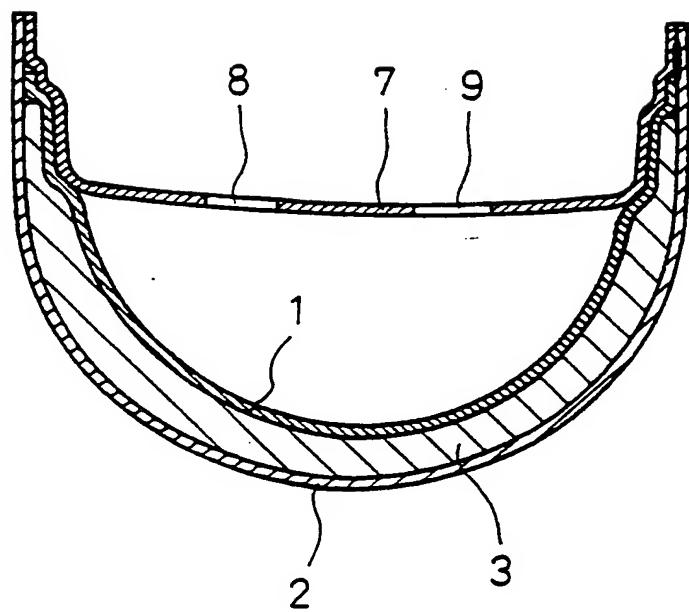


FIG.2

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FIG.3



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DISPOSABLE DIAPERS

This invention relates to disposable diapers adapted to absorb and hold body exudates such as urine and excretions.

Japanese Patent Application Disclosure Gazette No. 1991-231664 discloses a disposable diaper comprising a first liquid-permeable topsheet, a liquid-impermeable backsheet, a liquid-absorbent panel sandwiched between these sheets and a second liquid-permeable topsheet overlaid on said first liquid-permeable topsheet and bonded at longitudinally opposite ends thereof to said first topsheet.

In the diaper disclosed in the above-identified patent application, it is intended to put the second liquid-permeable topsheet in contact with a wearer's skin over the crotch zone so as to reliably hold excrements. However, depending on particular characteristics of excretions (or faeces) as well as the fitting of the second liquid-permeable topsheet to the crotch zone, it is apprehended that a mass of excrements might be squeezed between the wearer's skin and the second liquid-permeable topsheet and the wearer's skin might be smeared over a wide area with excrements thus uncontrollably spread. Should excrement cling to urinary

and genital organs, the problem will be serious from the sanitary view point.

Accordingly, it is a principal object of the invention to improve the second liquid-permeable topsheet so that the above-mentioned problems may be effectively overcome even when said second liquid-permeable topsheet is adopted.

The object set forth above is achieved, in accordance with the invention, by a disposable diaper comprising a first liquid-permeable topsheet, a liquid-impermeable backsheets and a liquid-absorbent panel sandwiched between these sheets to form a basic diaper structure and additionally comprising a second liquid-permeable topsheet overlaid said first liquid-permeable topsheet and bonded at its longitudinally opposite ends to said basic diaper structure, characterized by that said second liquid-permeable topsheet is made of a sheet being stretchable both in length and width; said bonding is performed as said second liquid-permeable topsheet is being stretched both in length and width; and said second liquid-permeable topsheet is provided at locations corresponding to the wearer's urinary organs and anus with openings being independent from each other.

While the second liquid-permeable topsheet is put in

contact with the wearer's skin over the crotch zone, one of said openings are properly aligned with the urinary organs and the anus, respectively, so that discharged urine and excrements may flow through the respective openings into a space defined between the second liquid-permeable topsheet and the first liquid-permeable topsheet underlying said second liquid-permeable topsheet.

The invention will be described in more detail by way of example with reference to the accompanying drawings, in which:

Fig. 1 is a sketch showing an embodiment of a diaper constructed according to the invention as erected:

Fig. 2 is a developed plan view showing, as partially broken, said diaper; and

Fig. 3 is a sectional view taken along a line X-X in Fig. 2, showing said diaper as being curved.

Referring to Figs. 1 and 2, a basic diaper structure comprises a first liquid-permeable topsheet 1, a liquid-impermeable backsheet 2, a liquid-absorbent panel 3 sandwiched between said top- and back-sheets 1, 2, elastic members 4, 5 provided between said top- and back-sheets 1,

2 along the laterally opposite sides and along the rear body's waist, respectively, and fasteners 6 connected to the laterally opposite ends of the rear body's waist.

A second liquid-permeable topsheet 7 is laid on the first liquid-permeable topsheet 1 and bonded at its longitudinally opposite ends to the first liquid-permeable topsheet 1 and the liquid-impermeable backsheet 2 as indicated by an oblique broken lines area in Fig. 2. The second topsheet 7 is stretchable both in length and width and bonded to the basic diaper structure as said second topsheet 7 is being stretched both in length and width so that the second topsheet 7 has an actual width appropriately narrower than the width of the first topsheet 1. The second topsheet 7 is provided at locations corresponding to the wearer's urinary organs and anus with openings 8, 9 when the diaper is put on the wearer so dimensioned that urine and excrements discharged from the respective organs may pass through the respective openings 8, 9 without smearing the top surface of the second topsheet 7. These openings 8, 9 are independent from each other leaving a portion 10 therebetween. Though not shown, an elastic member may be provided contractibly at the lateral center of the portion 10, that is, between of the openings 8, 9.

The second topsheet 7 has an elongating stress adjusted to 50 to 500g/inch and the panel 3 has a bending

resistance adjusted to 5 to 20g·cm as measured according to the Taber method. With a consequence, the first and second topsheets 1, 7 are spaced from each other at the maximum preferably by 10mm or more when the diaper is curved under the elongating stress of the second topsheet 7 as shown by Fig. 3.

The topsheets 1, 7 may be made of any nonwoven fabric, the backsheet 2 may be made of any suitable plastic film and the panel 3 may be made of any suitable fluff pulp mixed with superabsorbent polymer.

With the disposable diaper of the invention, as has been described above, the second liquid-permeable topsheet 7 is provided with a pair of the openings 8, 9 adapted to be aligned with urinary organs and anus, respectively, as the second liquid-permeable topsheet 7 closely contacts the wearer's skin over the crotch zone so that urine and excrements discharged from the respective organs may flow through the respective openings 8, 9 directly into the space defined between the second liquid-permeable topsheet 7 and the first liquid-permeable topsheet 1. Accordingly, there is no apprehension that the wearer's skin might be smeared with excrements having been squeezed between the wearer's skin and the second liquid-permeable topsheet 7 and spread. Particularly, the portion 10 of the second liquid-permeable topsheet 7 interposed between the openings

8, 9 and closely contacting the wearer's skin advantageously functions as a barrier to prevent excrements from flowing toward and clinging to the urinary and genital organs.

CLAIMS

1. A disposable diaper comprising a first liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent panel sandwiched between these sheets to form a basic diaper structure and additionally comprising a second liquid-permeable topsheet overlying said first liquid-permeable topsheet and bonded at its longitudinally opposite ends to said basic diaper structure, wherein:

 said second liquid-permeable topsheet is made of a sheet being stretchable both in length and width; said bonding is performed as said second liquid-permeable topsheet is being stretched both in length and width; and said second liquid-permeable topsheet is provided at locations corresponding to the wearer's urinary organs and anus with openings being independent from each other.

2. A disposable diaper according to Claim 1, wherein said second topsheet has an elongated stress adjusted to 50 to 500g/inch and said panel has a bending resistance adjusted to 5 to 20g.cm as measured according to the Taber method.

3. A disposable diaper according to Claim 1 or 2, wherein said second topsheet is made of nonwoven fabric.

4. A disposable diaper substantially as herein described with reference to the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)

Application number

GB 9313376.7

Relevant Technical fields

(i) UK CI (Edition L) A5R (RPC, RPG, RPM)

Search Examiner

(ii) Int CI (Edition 5) A61F

MISS M M KELMAN

Databases (see over)

(i) UK Patent Office

Date of Search

(ii) ONLINE DATABASES: WPI

23 SEPTEMBER 1993

Documents considered relevant following a search in respect of claims

1 TO 4

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
Y	GB 1298527 A (BURGER)	1,3
Y	WO 89/11843 A1 (KHAN) see pages 13 to 15 and Figures 18 and 19	1,3
Y	WO 89/11842 A1 (KHAN) see pages 13 to 15 and Figures 18 and 19	1,3

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

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